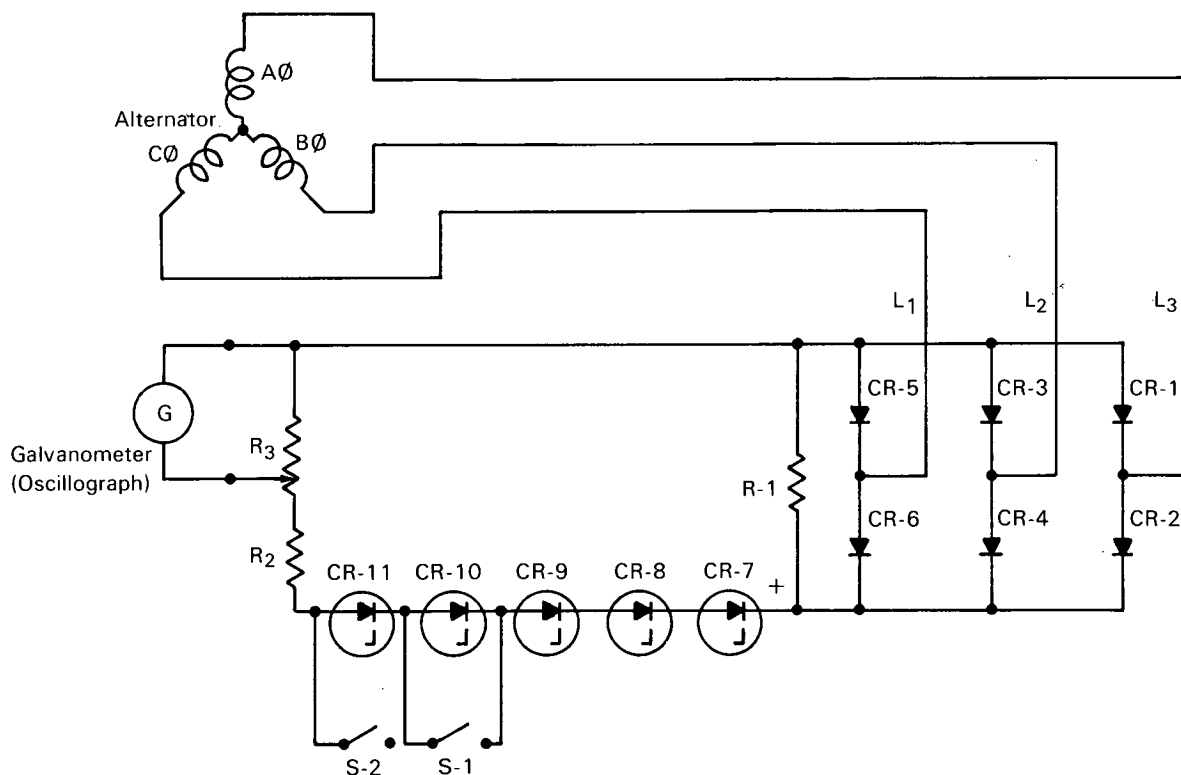


NASA TECH BRIEF



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Method for Measuring Alternator Voltage Transients



A transient voltage detection circuit was built to measure voltage excursions and recovery times resulting from step-load changes applied to a combination alternator-voltage regulator. The circuit mainly consists of a three-phase full-wave bridge, zener diodes to step down the voltage, and an oscillographic recorder.

As shown in the figure, the three alternator phase voltages (L_1 , L_2 , L_3) are fed into a three-phase, full-wave bridge (CR-1 through CR-6). The direct current output is dropped down by 36 volts for each zener diode

(CR-7 through CR-11). The total voltage drop is determined by switches S-1 and S-2. S-1 and S-2 are necessary to short out two zener diodes in those cases where the load applied to the alternator is sufficient to cause a voltage undershoot which falls below the total breakover voltage of the zener diodes in series. If this were allowed to happen, the zener diodes would no longer conduct and the galvanometer would not follow the voltage excursion. Resistor R-1 is used to assure sufficient current through the bridge at all times. This ensures linear operation of CR-1 through

(continued overleaf)

CR-6. Resistors R-2 and R-3 are used for the calibration of the oscillograph.

Notes:

1. The circuit is an inexpensive, fast AC-DC converter. It can be of particular use when testing three-phase systems or high-voltage DC systems where oscillographic data is needed.
2. The most important feature of this circuit is that it has a very small, insignificant time constant because no reactive components such as step-down transformers are used. Therefore, the time response data is inherently more accurate.

3. Documentation for the innovation is available from:
Clearinghouse for Federal Scientific
and Technical Information
Springfield, Virginia 22151
Price \$3.00

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Patent status:

No patent action is contemplated by NASA.

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